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FEASIBILITY OF AËROSTATION.

BY KARL BLIND.

“NEVER speak to me any more of that subject !” Such was the lofty utterance of Napoleon the Great, after having been told of the applicability of steam power for purposes of locomotion. The idea of railways, of steamboats, was, in his eyes, sheer nonsense. On his part, Franklin, who snatched the lightning from the clouds, broke forth, after having been present at the first aëronautic attempt, into the significant remark : “ This is the birth of the child ! ”

Since then, it is true, the child has not made very much progress. A main reason of its backwardness is that its natural teachers, the men of science, have for a long time neglected its education ; very few of them feeling inclined to undergo for its sake even a small amount of personal danger. Hence the child—as one of the most courageous, and, at the same time, truly scientific French aëronauts, M. Wilfrid de Fonvielle, aptly put it—has “ run about with the rope-dancers.” That is to say, it has fallen into the hands of men of small scientific knowledge, who mostly occupied themselves with air-ships in order to make money.

Men like Glaisher are rare. He rose about thirty times for the object of solving questions of meteorology. Once, having attained, in company with Mr. Coxwell, a height of 28,000 feet, he narrowly escaped death, losing, in the descent, all his scientific apparatus. He is one of the boldest pioneers in the pathless regions of Cloudland. Not the least of his discoveries is that the old notion of an incessant decrease of warmth in proportion to altitude—a notion already refuted on mountain-tops—has proved surprisingly erroneous. Several times he met, at great height, veritable Gulf-streams of air, as warm as they issue from the Mexican Gulf. The only doubt is whether those celestial warm

currents proceed from our globe, or whether they are in connection with unexplored air strata of the constellations within which we revolve.

Even in their present unsatisfactory condition, balloons are of good use for questions of meteorology, of the chemical composition of the air, partly, also, of astronomy, not to speak of the application of captive balloons for strategic purposes—namely, for obtaining an insight into the enemy's strength and military disposition. However, the question is, to make air-ships really steerable. That has been the dream of ages since the mythical days of Dædalus and Ikarus, whose story, no doubt, has reference to an early attempt at aerial flight. Perhaps the same might be asserted of the cloud-cars in which kings, in old Hindoo poetry, were said to ride or to descend earthwards.

Be that as it may, the problem of attaining regular locomotion in the air has, in later years, occupied the minds of a considerable number of engineers and amateur scientists. In the country of Montgolfier and Pilatre de Rozier, these exertions have been most conspicuous. Few among the public at large are probably aware that a partial, but very remarkable, success has already been achieved in that respect—a success which promises the fuller solution of the task at perhaps no distant time.

On this subject, General W. N. Hutchinson has recently published a very noteworthy treatise, under the title of “The Navigable Balloon in War and Peace.” Having referred to the somewhat clumsy, cigar-shaped balloon, inflated with coal-gas and impelled by a three horse-power steam-engine, which the talented French engineer, M. Henri Giffard, built in 1852 and successfully steered in a slanting direction to the wind's eye, General Hutchinson remarks :

“Much has been done since in Germany and elsewhere, and attempted in Russia. In France, the brothers Tissandier, M. de Lôme, and, recently, Captain Renard, with M. Krebs, liberally assisted by their Government, have scientifically and energetically taken up the task so admirably entered on by Henri Giffard. In September and November, 1885, they (Renard and Krebs) made highly successful trips from Chalais Meudon in a fish-shaped balloon, about one hundred and eighty feet in length and nearly forty in diameter, supporting a car one hundred and eight feet long, six and a half deep, and four and a half broad, sometimes carrying three aéronauts in cruises of about three-quarters of an hour. On one occasion, a nine-mile breeze blowing, they travelled at the rate of fourteen miles an hour, head to wind, thus gaining on the wind, when it was dead ahead, at the rate of five miles an hour. After sundry evolutions, to convince the most sceptical of the perfect obedience of their little vessel to its helm, *they returned to the exact spot they had quitted.* Electricity was

their motive power. Such unquestionable feats stimulated the heads of the military departments in other countries to strenuous exertions towards yet further improvements, in the conviction that success, besides immensely increasing their efficiency in war, would, by reason of navigables superseding far costlier armaments, lead to great economy."

In Germany and England, as well as in France, there are now men, well qualified to give an opinion, who no longer despair of solving a problem which has hitherto baffled man's mechanical ingenuity. We are so accustomed to the wonders of steam-power, of telegraphy, of phonography, of the spectroscope, of electrical light, and so forth, that we have almost ceased to look upon them otherwise than as very simple, every-day appliances. The day will come when people will have the same feeling in regard to navigable air-ships.

Quite recently, at the meeting of the British Association at Bath, Sir Frederick Bramwell, in his address as president, gave utterance to the firmest hopes, in speaking of "the poetical feeling which would be excited in the breast of that engineer who would in the near future solve the problem—and it certainly *would* be solved when a sufficiently light motor was obtained—of travelling in the air, whether this solution were effected by enabling the self-suspended balloon to be propelled and directed, or, perhaps, better still, by enabling not only the propulsion to be effected, and the direction to be controlled, but by enabling the suspension in the air itself to be attained, by mechanical means."

It would be impossible, within the space of this sketch, to give even an abstract of the mechanical suggestions and facts contained in General Hutchinson's valuable treatise. Two short quotations may, however, be of service :

"Experiments making in Germany will lead, it is expected, to economically-worked steam-generators being employed to propel torpedo-boats, ships, railway locomotives, and navigable balloons. To obtain navigables for war purposes, such anxious attention is now paid by rival nations that, through the introduction of cheap aluminium, instantaneous generation of steam, saving of weight and bulk by oil-fuel, prevention of skin-plating, the adoption for propulsion of two long shafts (with several pairs of blades) rotating at their extremities in fixed sockets, or propulsion by atmospheric turbines, it seems almost certain that extensive aerial navigation will soon be an accomplished fact."

And again:

"This favorable prediction has, fortunately, received yet further strong confirmation in the crowning invention of the past memorable year, due to the mechanical genius of an English Protestant clergyman, Dr. T. Jones, incumbent of Curdworth.

To his wish, last autumn, to propel by steam the tricycle on which he often rode when visiting distant parishioners, we owe what is probably the greatest invention of the present age, if it be regarded in a utilitarian point of view. At least, such was the opinion formed by most of the engineers and scientific men who had the gratification of witnessing the trial made at his vicarage, of the simple, yet clever, design."

In a note added after the first issue of his treatise, General Hutchinson further remarks:

"Since the publication of the following pages, a novel invention has been made public, which makes attainable a far lighter motor than any which the most sanguine could have before deemed possible. On the 7th of July, 1888, the specification of a patent was published, describing a method of ejecting steam directly upon the back of the propelling turbine blades without the intervention of any engine. This invention, used in combination with the 'instantaneous steam-generator,' which requires no boiler, will enable an efficient driving power of wonderfully little weight to be constructed."

Quite in accordance with his calling, General Hutchinson is eloquent on the use of guidable air-ships for warlike operations. He says that the country which first possesses efficient war-navigables must be the dominant power, and that the nation which is the first in possessing such balloons could, with ease and in security, destroy upon the building-stocks any which a hostile nation might have in course of construction. It is true the aged warrior hopes that, finally, so formidable an invention, insuring commandership in the skies, will become but another influence in the cause of peace; for "the more the inevitably increasing horrors attendant upon war are made manifest, the greater the hope that the organization of large masses of armed men to slaughter and be slaughtered will soon be abandoned in favor of the settlement of disputes by friendly arbitration." Would that we could join in this hope, for the sake of humanity!

Meanwhile we might be right glad if that more idyllic, more peaceful, intercourse so beautifully described and foreshadowed by Wilfrid de Fonvielle, in his excellent work "*La Science en Ballon*," were attained by an invention which might truly be compared to Dr. Faust's magic mantle, or to the thread of Ariadne in the Labyrinth of the Skies. Fonvielle, a Republican whom I have known since the stormy days of 1849, has given his proofs in various ways—by fighting in the cause of popular freedom, by undergoing transportation to Lambessa after Napoleon's state-stroke, by exile to England, as well as by numerous aëronautic voyages at the risk of his life. In the course of the

war of 1870,—the outbreak of which, however, he honestly deplored,—we had, necessarily, to be on opposite sides. Our friendship has not been altered thereby. When Paris was besieged, he left it, after Gambetta, in a balloon, as the bearer of a message. Proceeding afterwards to England, he came to my house with Dr. Congreve, the leader of the Positivist school in England, who was also on the French side. It need not be said that we differed in opinion then. The view I expressed to them was fully borne out by subsequent events.

With much pleasure do I remember the ascent made from London, years ago, in company with this good old French friend, in the giant captive balloon, which had been brought over from Paris by a number of aëronauts. Another previous invitation, which I had accepted, to join in a proposed ascent in the balloon sent to London by Mr. Giffard, came to nothing; for before I was able to avail myself of the opportunity, the balloon burst in consequence of a fire.

More fortunate I was in the second instance, when we rose in the giant balloon under the direction of Mr. Glaisher. Wilfrid de Fonvielle was in the car, together with Messrs. Godard, Yon, Mangin, Chevantier and Tissandier—a whole clan of French sailors of the sky. Mr. Breary, the secretary of the English Aëronautic Society, and some others, also joined in the ascent. Our friends, Ledru-Rollin and Louis Blanc, had been asked, but they politely and thankfully declined. The wind was so high that Mr. Glaisher at first intended giving up the venture for another day. But finally it was decided by the council of war of the air-skippers that it should be attempted.

It was with difficulty that the balloon was piloted up so as not to strike the enclosure, when, to a certainty, it would have exploded. Having risen to a great altitude, it spun round in a somewhat mad and irregular dance, owing to the violence of the storm. The wind blew—as stated in the work edited by Glaisher and Fonvielle—with a force of sixty miles an hour. Several times the balloon went over sidewise. The “car,” it ought to be mentioned, was not a car, properly speaking, but a circular piece of wicker-work in ring shape, through whose apertures the shifting landscape could be seen. Few, however, could bear this eye-confusing outlook through the inside. There were no seats—only narrow standing room, about breast-high. In consequence of the fre-

quent sudden changes of the angle of the car, through terrific gusts of wind, a gentleman of the company was seized with one of those extraordinary fits of vertigo which induced him to attempt throwing himself over the precipice, if I may so say. He was, fortunately, held back in time, and then knelt down sideways, so as to be shut out from all disturbing sight into the vast empty space.

I cannot here dwell on the grandeur of the panorama unrolled before our eyes, and the solemn impressiveness of the whole scene. The absolute stillness which prevailed as we rose higher and higher, seemed something supernatural. Glaisher and Fonvielle have described that day most graphically and beautifully. A short quotation, at least, may be allowed:

"The strong wind [it is said in their work, "*Travels in the Air*"] blew at the rate of sixty miles an hour. It whistled through the ropes—the balloon lay over—and the car oscillated violently. We were blown about six hundred and sixty feet beyond the boundary of the enclosure below. . . . The sky presented an admirable aspect. The sun appeared in the midst of mountains of cloud, and its brilliant rays transformed the Thames into a river of fire. Houses, trees, and streets appeared no larger than children's toys, and the general aspect of things was the same as we experienced in ordinary balloon ascents. In some of our aerial excursions we have risen to a height of nine thousand eight hundred and forty-three feet, and the landscape, seen from this altitude, is not more striking than from the car of the captive balloon."

We were finally wound back after the danger signal had been hung out from the car by Mr. Glaisher's orders. Whilst greatly enjoying the trip, I avow that the descent, owing to the force of the wind, was hideous. We had, repeatedly, the feeling as if the head were pushed into the abdomen or the stomach into the brain.

Afterwards, another ascent, at night, was planned, with the aid of the electrical light, for meteorological investigation. Only four men accepted the invitation; among them the Duke of Sutherland and the present writer, with his son, who had also been in the ascent just mentioned. The balloon, however, suddenly broke loose before the day fixed. Shooting up like a cannon-ball, it flew away at a height which rendered it almost invisible for a time. At last it fell down, exploded, in Buckinghamshire. I still possess a piece of its skin as a reminder of having been very near a cloud-wreck.

As for a long time I had heard a great deal of what was being done in France, I felt it a duty, some years back, to write an

urgent appeal—published in the Literary Gazette of the *Vossische Zeitung*, the chief journal at Berlin—for the establishment of a “German Society of Aëronauts.” Soon afterwards, the Society was founded under that name. At its request, I acted as the first medium of its communications with the London Balloon Society. Science is cosmopolitan, and, though only following these matters as a humble but diligent observer, I confess I am deeply impressed with the importance of the aëronautic movement. This may be an excuse for having referred to a personal experience, however slight, the result of which has, at any rate, been to make me look with ever-increasing interest upon the labors of men who, I fully trust, will, in our time, succeed in annexing Cloudland to the Realm or Republic of Science.

KARL BLIND.